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# The Cotton Industry in PERU

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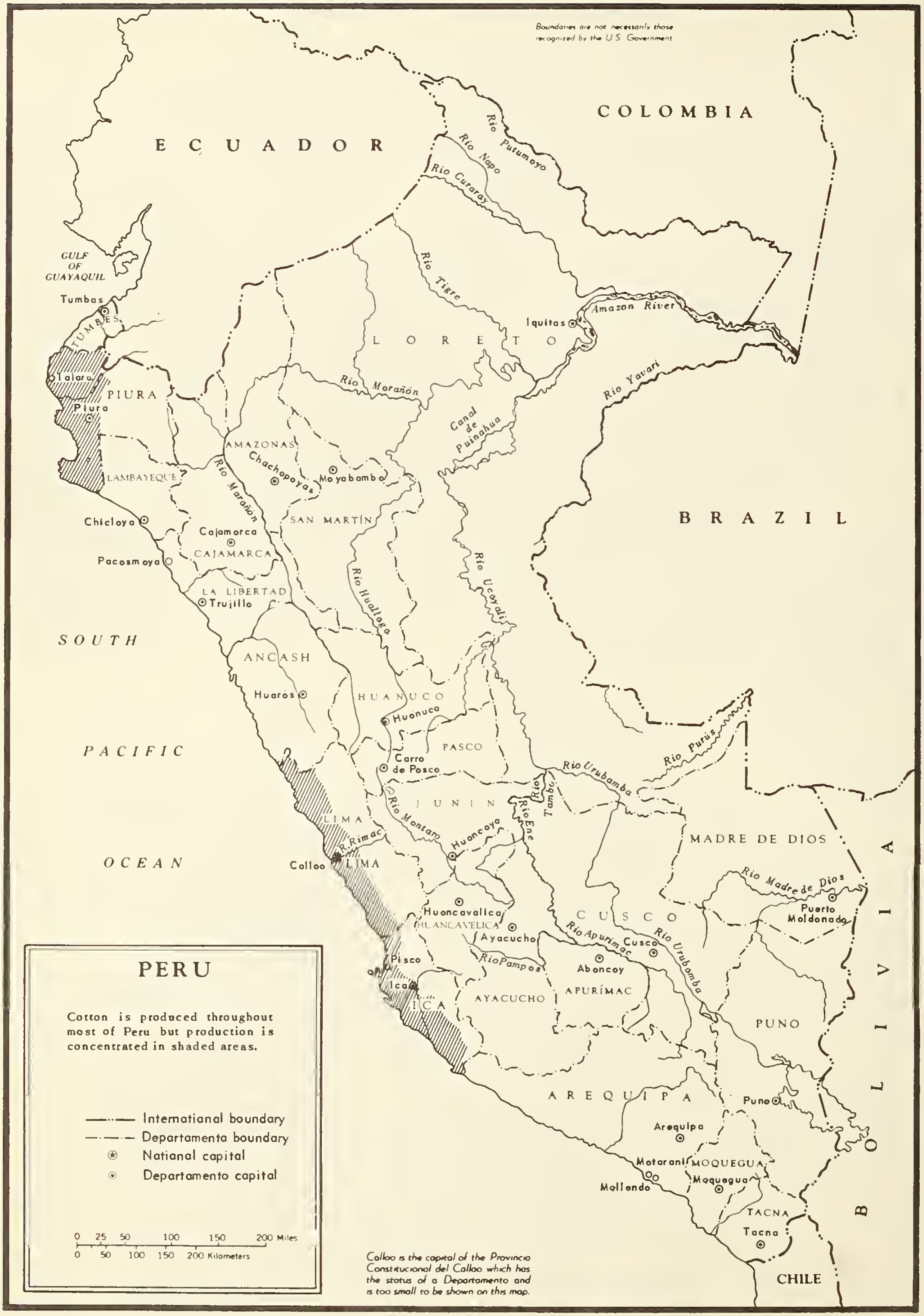

# PERU

Cotton is produced throughout most of Peru but production is concentrated in shaded areas.

Boundaries are not necessarily those recognized by the U.S. Government

Callao is the capital of the Provincia Constitucional del Callao which has the status of a Departamento and is too small to be shown on this map.

# INTRODUCTION

Cotton accounts for about one-fourth of the value of all Peruvian exports and one-half of its agricultural exports. It is an important source of foreign exchange, supplies raw materials for Peru's cotton textile industry, yields cottonseed oil and cake, and provides jobs for many thousands of individuals.

Cotton is native to Peru and has existed there as a cultivated plant for thousands of years. Francisco Pizarro found it widely used in 1952 and cotton cloth has been discovered in ancient Peruvian tombs. The early Spaniards, interested primarily in precious metals, paid little or no attention to this plant grown by the native Indians.

Commercial cotton production, as it is now known, did not get underway until the early 1860's, when the shortage of European cotton resulting from the American Civil War caused English cotton and textile leaders to join local interests in the active promotion of cotton production in Peru. This promotion included the introduction of seed of cotton varieties popular in the United States and Egypt and favored in the mill areas of Great Britain.

Under the stimulus of high wartime prices and this promotion of production, output jumped sharply during the years of the "cotton famine." However, after the war production trailed away and the significance of Peruvian cotton in world trade declined drastically. This decline can be partially attributed to the drop in world prices as sizable exports from the United States resumed. Another cause was the fact that, for many producers, cotton was an entirely new crop and one they had not yet learned to grow successfully over long periods of time. Consequently, cotton had little real holding power and cropping systems returned to their former pattern.

During the remainder of the 19th century and the first two decades of the 20th century, various developments took place that eventually contributed to the strength of cotton in the Peruvian agricultural economy. Irrigation systems in the coastal valleys were modernized and new varieties were imported from the United States and Egypt and tested under Peruvian conditions. During the latter part of this period, the Peruvians began subjecting insect problems to scientific investigation.

Insect problems forced farmers in the Chira and Piura Valleys of Northern Peru to abandon the production of perennial cotton in favor first of Upland Suave and Mit-Afifi, and later of Pima, now the dominant variety in the area. In other cotton valleys, the traditional and introduced varieties were displaced by Tanguis between 1911, when commercial production of Tanguis began, and the late 1920's, when production of the other varities became unimportant.

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# THE COTTON INDUSTRY IN PERU

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## SUMMARY AND CONCLUSIONS

During the past 40 years, Peru has been an increasingly important exporter of cotton. Among the more important factors that have contributed to this record are: (1) Low variability of yield because practically all of Peru's cotton is grown under irrigation, (2) a sufficiently strong competitive position in most areas of production to keep acreage on existing land in the various valleys fairly stable from one year to another and to make cotton a strong competitor for additional land brought under irrigation. (The fact that some Tanguis cotton is grown as a perennial crop contributes further to the stability of acreage.) Except during World War II, when the United States assisted Peru in holding sizable stocks of Peruvian cotton for which there was no immediate market, Peru has avoided action programs of the type that would tend to cause large quantities of cotton to be withheld from the export market.

During the decade of the 1950's, a sustained upward trend has occurred, both in cotton production and in exports. Expansion of extra-long-staple cotton (Pima and Karnak), although showing no upward trend for a number of years, has more than doubled the 1945-49 average in recent years. Tanguis production has increased more than 50 percent in this same length of time.

Further production increases are expected to result from: (1) An increased supply of irrigation water, (2) an increase in the amount of land under irrigation in cotton producing areas, (3) more efficient use of existing irrigation water, (4) some increase in production in interior areas, (5) gradual increases in the average yields through breeding and increased reliance upon higher yielding strains and varieties of cotton, and (6) improvement in soil fertility and yield levels through improved fertilization, cultural methods, and insect control.

There are strong indications that a concentrated effort will be made in Peru in the years ahead both to incorporate a greater proportion of the population into the economic life of the country and to raise the average level of living of those who now play an active part in its economic life. Economic development on the scale envisioned will not only increase the relative demand for food crops, but will increase the domestic demand for cotton textiles as well. Pressure to earn foreign exchange from the export of agricultural products will continue. Therefore, it would seem likely that total production of both food crops and cotton will rise.

If the population of Peru is to achieve its maximum domestic consumption of cotton textiles, the mills will have to modernize or replace much of their older machinery, and make other changes to increase production efficiency. It seems quite likely that a market development program taking full account of the nature of the Peruvian economy could help increase the rate of gain in per capita cotton consumption.

## COTTON PRODUCTION

Intensity of Production. The intensity of cotton cultivation differs in the various parts of Peru. Practically all of the cotton is produced west of the Andes in the irrigated valleys of rivers with their sources in the mountains. All Peruvian cotton grown in these coastal valleys is irrigated but much of it does not have water available over as long a season as is ideal for cotton.

The proportion of land devoted to cotton also varies. In 1955, for example, (the latest year for which detailed data are available) cotton was grown on 62 percent of the cropland in Ica Department, 53 percent in Piura, 45 percent in Lima y Callao, 24 percent in San Martin, 17 percent in Tacna, 11 percent in Arequipa, and 10 percent in Moquegua. In the other 7 Departments, cotton occupied less than 10 percent of the cropland.

Rice and sugar cane are also important plantation-type crops. Rice occupies 10 percent or more of the cropland in 4 of the 15 Departments in which it was grown in 1955. Sugar cane takes up 10 percent of the land farmed in 2 of the 6 Departments in which it is grown. In general, there is little direct competition between cotton and sugar, since the latter is normally the more profitable crop if located sufficiently near a mill. Rice is frequently competitive with cotton in areas where farmers shift one way or the other depending upon current and prospective price relationships.

TABLE 1.--Cotton, rice, and sugar: Acreage and percentage of total all crops by areas and departments, 1955

| Departments | Acreage of specified crops | | | | Percentage of total | | |
|---|---|---|---|---|---|---|---|
| | Total all crops | Cotton | Rice | Sugar | Cotton | Rice | Sugar |
| | *1,000 acres* | *1,000 acres* | *1,000 acres* | *1,000 acres* | *Percent* | *Percent* | *Percent* |
| Tumbes............. | 10 | -- | 1 | -- | -- | 12.2 | -- |
| Piura.............. | 229 | 122 | 19 | 1 | 53.1 | 8.0 | .4 |
| Cajamarca.......... | 172 | -- | 7 | -- | -- | 4.2 | -- |
| Lambayeque......... | 180 | 3 | 45 | 53 | 1.6 | 24.9 | 29.3 |
| La Libertad........ | 315 | 5 | 49 | 68 | 1.7 | 15.6 | 21.5 |
| Ancash............. | 357 | 24 | 9 | 4 | 6.7 | 2.6 | 1.3 |
| North............ | 1,263 | 154 | 130 | 126 | 12.2 | 10.3 | 10.0 |
| Huanuco............ | 122 | 1 | 1 | -- | 1.1 | .5 | -- |
| Junin.............. | 283 | -- | (1) | -- | -- | .6 | -- |
| Pasco.............. | 37 | -- | -- | -- | -- | -- | -- |
| Lima y Callao...... | 410 | 184 | 1 | 12 | 44.9 | .2 | 2.9 |
| Ica................ | 250 | 156 | -- | -- | 62.3 | -- | -- |
| Huancavelica....... | 297 | -- | -- | -- | -- | -- | -- |
| Ayacucho........... | 376 | 2 | (1) | -- | .5 | .1 | -- |
| Center.......... | 1,775 | 343 | 2 | 12 | 19.4 | .1 | .7 |
| Cusco.............. | 390 | -- | -- | -- | -- | -- | -- |
| Apurimac........... | 113 | -- | -- | -- | -- | -- | -- |
| Arequipa........... | 156 | 17 | 12 | 3 | 11.0 | 7.5 | 1.7 |
| Puno............... | 393 | -- | -- | -- | -- | -- | -- |
| Moquegua........... | 11 | 1 | -- | -- | 9.7 | -- | -- |
| Tacna.............. | 26 | 5 | -- | -- | 16.7 | -- | -- |
| South........... | 1,089 | 23 | 12 | 3 | 2.1 | 1.1 | .2 |
| Loreto............. | 16 | (1) | 4 | -- | 1.1 | 24.4 | -- |
| Amazonas........... | 102 | -- | 1 | -- | -- | 1.2 | -- |
| San Martin......... | 72 | 17 | 4 | -- | 24.0 | 5.6 | -- |
| Madre de Dios...... | 7 | -- | (1) | -- | -- | 6.0 | -- |
| East............ | 197 | 17 | 9 | -- | 8.9 | 4.9 | -- |
| National Total. | 4,324 | 537 | 153 | 141 | 12.4 | 3.5 | 3.3 |

[1] Less than 500 acres.

Source: Anuario Estadístico, 1955.

To an extent, the Government of Peru has taken steps to limit concentration upon cotton production by setting minimum proportions of cropland in various valleys that must be devoted to food crops. The purpose of these regulations is to assure a sufficient supply of reasonably priced food in Lima and other coastal cities. Without such controls, cotton, which is usually more profitable to growers than food crops, would be expanded and food production reduced.

In mid-1960, the government stipulated proportions of the cropland that were to be devoted to food crops. The basis for determining the percentage is the number of months of the year that sufficient irrigation water is normally available. As a general guide rule, valleys with water available on a year-round basis must devote 35 percent of their land to food crops; whereas, a valley with 5 months of water is required to devote only 15 percent. The actual allowances are:

| | *Percent* |
|---|---|
| Tumbes and Piura Departments: | |
| All valleys | 25 |
| Lambayeque, La Libertad, Arequipa, Moquegua, and Tacna Departments: | |
| All valleys | 30 |
| Ancash Department: | |
| Valleys- | |
| Santa | 30 |
| Nepena, Casma, and Huarmey | 20 |
| Lima Department: | |
| Valleys- | |
| Rimac | 35 |
| Pativilca, Barranca, Supe, Chillon, Mala, and Canete | 30 |
| Huaura | 25 to 30 |
| Sayan, Huaral, and Chancay | 20 |
| Lurin and Pachacamac | 15 |
| Ica Department: | |
| Valleys- | |
| Chincha and Pisco | 20 |
| Ica, Palpa, Ingenio, and Nazca | 15 |

Varieties. In recent years there have been some 5 or 6 varieties (or broad kinds) of cotton grown commercially in Peru. Tanguis, a long-staple cotton, is the most important. It accounted for 76.3 percent of total cotton production in 1957, the latest year for which figures are available by varieties and Departments.

In 1957, Tanguis was the only variety produced in the Departments of Ancash, Ica, La Libertad, Lima y Callao, Moquegua, and Tacna. It also made up more than half of the cotton produced in Arequipa.

Practically all the cotton improvement work in Peru is concentrated on Tanguis cotton. A cotton experiment station was established at Cañete in 1926 and the La Molina Agricultural Experiment Station was established in 1927. Both of these stations carry on important cotton research but at La Molina cotton is but one of many products upon which research is conducted. Additional work on cotton was inaugurated in 1940 when the National Agrarian Society organized the Institute of Cotton Genetics with headquarters at La Molina. At each of these centers, work is underway in cotton genetics, entomology, and agronomy.

Through the years, a number of improved strains of Tanguis cotton have been developed and placed in commercial production. Each of the various strains currently in production has its devotees and a certain mixing is inevitable. Present improvement work takes the usual interest in improving yields and resistance. In addition, there is a desire to restore the same length, roughness, and other fiber characteristics that originally earned Tanguis its outstanding reputation.

TABLE 2.--Production by variety and departments, 1957

| Department | Tanguis | Pima | Acala | Aspero and Semi-Aspero | Karnak | Total |
|---|---|---|---|---|---|---|
| | *Bales* | *Bales* | *Bales* | *Bales* | *Bales* | *Bales* |
| Amazonas......... | -- | 2,246 | -- | -- | -- | 2,246 |
| Ancash........... | 32,554 | -- | -- | -- | -- | 32,554 |
| Arequipa......... | 15,421 | 8,564 | -- | -- | -- | 23,985 |
| Ayacucho......... | -- | -- | -- | 1,169 | -- | 1,169 |
| Cajamarca........ | -- | 1,896 | -- | -- | -- | 1,896 |
| Huánuco.......... | -- | -- | -- | 262 | -- | 262 |
| Ica.............. | 138,280 | -- | -- | -- | -- | 138,280 |
| La Libertad...... | 7,618 | -- | -- | -- | -- | 7,618 |
| Lambayeque....... | -- | 1,611 | 152 | -- | 18 | 1,781 |
| Lima y Callao.... | 166,708 | -- | -- | -- | -- | 166,708 |
| Loreto........... | -- | -- | -- | 161 | -- | 161 |
| Moquegua......... | 1,366 | -- | -- | -- | -- | 1,366 |
| Piura............ | -- | 75,142 | 952 | -- | 17,826 | 93,920 |
| San Martín....... | -- | -- | -- | 3,868 | -- | 3,868 |
| Tacna............ | 3,857 | -- | -- | -- | -- | 3,857 |
| Total........ | 365,804 | 89,459 | 1,104 | 5,460 | 17,844 | 479,671 |

Source: Estadística de la Producción de Algodón en el Perú, 1957.

Tanguis was originally grown as a perennial crop but now only about 20 percent of it is ratooned. In fact, as an insect control measure, many areas prohibit this practice.

Pima, another important variety, accounted for 18.7 percent of national production in 1957. The main stronghold of this extra-long-staple cotton was the Piura Department where 84 percent of it was grown. Pima was the only variety grown in Amazonas and Cajamarca and accounted for over 90 percent of Lambayeque's cotton production.

The original planting stocks of Pima cotton were imported from the United States. Various strains have been tried and several are now in commercial production. These include Pima Coriente, Pima Direx, Pima 32, and Pima S-1. Few data are available on the relative importance of each of these, but presumably the Coriente is the most important, while S-1 is showing the greatest relative rate of gain. The Cotton Exchange reports that in 1958-59 Pima S-1 accounted for 2.9 percent of all cotton grown and 14 percent of the Pima grown.

The remaining 5 percent of Peruvian cotton, according to the 1957 figures, consists of Karnak (3.7 percent), Acala (0.2 percent), Aspero, and Semi-Aspero (along with Aspero, 1.1 percent). Karnak is an extra-long-staple cotton, grown primarily in Lambayeque and Piura. The planting stocks first came from Egypt. Acala is a long-staple cotton. Like Karnak, it is grown primarily in Lambayeque and Piura Departments. It was originally imported from the United States. Aspero and Semi-Aspero, unlike the other varieties, are not grown in the coastal valleys but, instead, in Ayacucho, Huanuco, Loreto, and San Martin Departments. Both are native extra-long-staple cottons.

Cerro, an Upland cotton of U.S. origin, was reported separately for the first time in 1958-59, but this variety accounted for only 0.1 percent of the total crop. According to the information for 1960, Cerro cotton was grown in the Piura, Chira, Lambayeque, and Bagua zones. No data are presently available on the length of cotton this variety gives under Peruvian conditions, but in the United States it is in the extra-long-staple category and Peruvian prices are quoted on the basis of 1-7/16 inch staple (extra-long).

Production Trends and Totals by Valleys. Through the years, there has been considerable change in the absolute and relative importance of the various valley cotton-producing areas. From an aggregate standpoint, production rose more or less steadily from 1916, the earliest year for which continuous data are available, until 1939-40. The combined effect of reduced export outlets and increased need for domestic food production caused cotton production to decline during and soon after World War II, and it was not until 1950-51 that production again reached the 1939-40 level of 382,000 bales. It has since continued to climb and has ranged from 482,000 to 532,000 bales in each of the six seasons starting with 1953-54.

At various times during the past twenty years, three different producing areas have led others in production. From 1939-40 through 1942-43, the Lima-Lurin-Pachacamac area led. From then through 1954-55 and again in 1956-57 and 1958-59, first place was occupied by the Ica-Palpa-Nazca-Acari area. The Piura-Chira area ranked first in cotton production in 1955-56 and 1957-58 although in 1955-56 it exceeded the Ica area by only 300 bales.

The Lima area produced 76,000 bales of cotton, 19.9 percent of the nation's crop, in 1939. Production subsequently declined to a low of 37,000 bales in 1948-49. In 1953-54, it reached a new high of 79,000 bales, and by 1956-57 was 82,000 bales--16.9 percent of total Peruvian production. Although total production rose somewhat from 1956-57 through 1958-59, the Lima area dropped to 58,000 bales in 1957-58 and in 1958-59, reached its lowest level since 1948-49--51,000 bales, only 9.5 percent of the nation's crop.

In 1939-40, the Ica area produced 58,000 bales or 15.2 percent of the total Peruvian crop. This level was surpassed in 1943-44 and still higher records were established in 1944-45. From 1949-52 to 1953-59, a new record was set each year.

In 1943-44, the Ica area became the largest producer of cotton in Peru, and this lead was maintained in every year except two. In 1958-59, the Ica area produced a record 127,000 bales of cotton, more than double the production in 1939-40. The Ica area has accounted for 18 to 24 percent of Peru's total crop in the period 1950-51 to date, a somewhat higher percentage than before World War II.

In 1939-40, cotton production in the Piura-Chira area totaled 52,000 bales, 13.7 percent of Peru's total production. In the six succeeding years, production ranged from a high of 57,000 bales to a low of 39,000 bales. Production fell to 26,000 bales in 1946-47, but jumped to a record of 70,000 bales in 1948-49. Wide year-to-year fluctuations have continued to occur, but production has continued to push to new high levels, establishing records in 1953-54, 1955-56, and 1957-58. In these three years, the Piura-Chira area accounted for 16.4, 20.6, and 23.2 percent, respectively, of total national cotton production. In both 1955-56 and 1957-58, the Piura-Chira production led all producing areas, exceeding even Ica.

TABLE 3.--Production by areas for specified periods

| Year | Piura-Chira | Huaura-Sayan | Chancay | Lima-Lurin-Pachacamac | Cañete | Chincha | Pisco | Ica-Palpa-Nazca-Acari | Other | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| | *1,000 bales*[1] | *1,000 bales*[1] | *1,000 bales*[1] | *1,000 bales*[1] | *1,000 bales*[1] | *1,000 bales*[1] | *1,000 bales*[1] | *1,000 bales*[1] | *1,000 bales*[1] | *1,000 bales*[1] |
| 1939-40.. | 52 | 28 | 38 | 76 | 43 | 28 | 26 | 58 | 33 | 382 |
| 1940-41.. | 47 | 26 | 37 | 63 | 39 | 24 | 26 | 44 | 23 | 329 |
| 1941-42.. | 57 | 28 | 32 | 60 | 31 | 26 | 26 | 45 | 17 | 322 |
| 1942-43.. | 39 | 20 | 28 | 51 | 30 | 17 | 20 | 45 | 12 | 262 |
| 1943-44.. | 52 | 29 | 28 | 51 | 34 | 23 | 21 | 59 | 13 | 310 |
| 1944-45.. | 46 | 24 | 29 | 52 | 44 | 30 | 22 | 66 | 12 | 325 |
| 1945-46.. | 50 | 33 | 28 | 51 | 42 | 31 | 22 | 58 | 14 | 329 |
| 1946-47.. | 26 | 27 | 26 | 50 | 38 | 34 | 25 | 60 | 13 | 299 |
| 1947-48.. | 28 | 28 | 24 | 43 | 35 | 25 | 24 | 63 | 12 | 282 |
| 1948-49.. | 70 | 28 | 23 | 37 | 31 | 21 | 25 | 65 | 9 | 309 |
| 1949-50.. | 32 | 41 | 25 | 54 | 36 | 34 | 33 | 68 | 14 | 337 |
| 1950-51.. | 27 | 42 | 26 | 65 | 46 | 40 | 31 | 85 | 20 | 382 |
| 1951-52.. | 55 | 60 | 33 | 66 | 50 | 36 | 30 | 91 | 22 | 443 |
| 1952-53.. | 49 | 53 | 28 | 73 | 49 | 39 | 35 | 88 | 27 | 441 |
| 1953-54.. | 84 | 72 | 32 | 79 | 56 | 41 | 30 | 94 | 26 | 514 |
| 1954-55.. | 73 | 53 | 24 | 75 | 42 | 43 | 32 | 108 | 32 | 482 |
| 1955-56.. | 109 | 63 | 26 | 77 | 27 | 43 | 30 | 109 | 45 | 529 |
| 1956-57.. | 95 | 70 | 27 | 82 | 31 | 14 | 13 | 111 | 41 | 484 |
| 1957-58.. | 122 | 39 | 25 | 58 | 40 | 33 | 22 | 120 | 67 | 526 |
| 1958-59.. | 116 | 38 | 22 | 51 | 56 | 40 | 28 | 127 | 54 | 532 |

[1] From 1939-40 to 1945-46, bales of 478 pounds. From 1946-47 to date, bales of 480 pounds.

Source: Cámara Algondonera del Perú Memoria Anual.

# COTTON EXPORTS

The cotton economy of Peru is oriented to a very large extent around the export of raw cotton. Annual data, which are available starting with 1916, reveal that in most years, 85 percent or more of the cotton produced moved out of the country as raw cotton. The only possible exceptions were war years in which inaccessibility to markets, either as a result of direct military operations or as a result of a scarcity of shipping facilities, interrupted the normal flow of cotton from Peru. These periods can, however, be thought of as periods of delayed exports, because following World Wars I and II, excess stocks were liquidated and exports in some years exceeded production. It is true, however, that during World War II, Peru found it advisable to reduce cotton production quite sharply in order to expand food production. Domestic cotton consumption was also expanded. As a result, total exports averaged lower during the 1940's than during the 1930's.

Each of the varieties of cotton produced in Peru enters the export trade. The minor varieties tend to be proportionately more important in the export trade than in total production because domestic mills use Tanguis and Pima almost exclusively. For example, in 1956, the latest year for which data are available, Peruvian mills filled 98 percent of their raw cotton needs with Tanguis cotton and they relied upon Pima for most of the remaining 2 percent.

All of Peru's export of cotton moves by ship. Annual data on exports by ports are available from 1940 to date. These data show one quite distinct trend and that is the decline during World War II in the number of ports sharing in the cotton business. In 1940, cotton moved out of 20 ports. By 1944, this had been reduced to 9 ports, and the range in subsequent years has been from 7 to 10. In most years, only 7 or 8 ports shared in the cotton export business.

Pisco has been the top ranking port for cotton exports in all years from 1940 to date. In 1958, nearly 32 percent of all cotton exported moved from that port. This compares with nearly 26 percent in 1940. In 1958, as at most times in the previous 17 years, Paita was the second ranking cotton port, accounting for 25 percent in 1958 and 20 percent in 1940. Huacho has increased in importance and in 1958, it accounted for 18 percent of the cotton trade compared with only 5 percent in 1940. Callao accounted for 16 percent of cotton exports in both periods. In 1958, Cerro Azul was the fifth ranking port with 8 percent of the cotton trade, a somewhat smaller share than the 12 percent handled by this port in 1940. Tacna and Iquitos regularly handle a small volume and Chimbote handles a small amount in some years.

In most recent years, Peru has exported cotton to some 26 or 27 countries scattered pretty well over the world. During this time the United Kingdom, Belgium, Chile, and Germany have been the largest customers. Over the five years 1954-58, they accounted for 19, 15, 13, and 11 percent respectively, or a total of 58 percent of Peruvian exports. If France, Netherlands, and the United States (with 8, 6, and 5 percent respectively) are added to the list, the seven countries account for 77 percent of Peru's cotton exports in the 5-year period. Although the rank of the individual countries changes some from year to year, the above-average picture is fairly typical of the patterns in most recent years.

A study of Peruvian exports through time reveals a much wider range of markets since the early 1930's than during the 1920's. During the decade of the 1920's, some 85 percent of Peruvian exports went to the United Kingdom, although there may have been some transshipment. The United States, a much larger purchaser of Peruvian Pima than of Tanguis, was the recipient of 11 percent of Peruvian cotton exports during that decade. The other 4 percent went mostly to Germany, but total exports to countries other than the United Kingdom and United States did not exceed 5,000 bales until 1927 when Germany started taking substantial quantities.

TABLE 4.--Exports by country of destination, averages 1920-24 - 1955-59

| Country | 1920-24 | 1925-29 | 1930-34 | 1935-39 | 1940-44 | 1945-49 | 1950-54 | 1955-59 |
|---|---|---|---|---|---|---|---|---|
| | *1,000 bales*[1] | *1,000 bales*[1] | *1,000 bales*[1] | *1,000 bales*[1] | *1,000 bales*[1] | *1,000 bales*[1] | *1,000 bales*[1] | *1,000 bales*[1] |
| United Kingdom... | 154 | 187 | 166 | 171 | 57 | 80 | 103 | 76 |
| Belgium.......... | 0 | (2) | 4 | 16 | (2) | 23 | 42 | 71 |
| Chile............ | (2) | (2) | 1 | 7 | 32 | 30 | 45 | 60 |
| Germany.......... | 1 | 12 | 60 | 94 | (3) | 2 | 25 | 55 |
| France........... | (2) | 1 | 3 | 9 | 1 | 6 | 28 | 35 |
| Netherlands...... | 0 | (2) | 2 | 13 | 1 | 11 | 16 | 28 |
| Japan............ | (2) | (2) | 3 | 31 | 57 | (3) | 12 | 22 |
| United States.... | 22 | 19 | 6 | 1 | 11 | 30 | 14 | 21 |
| Italy............ | (3) | (3) | 2 | 4 | 2 | 15 | 3 | 17 |
| Switzerland...... | (3) | (3) | (3) | (2) | 1 | 26 | 11 | 14 |
| Argentina........ | (3) | (3) | (3) | (2) | 4 | 7 | 10 | 12 |
| Denmark.......... | (3) | (3) | (2) | 1 | (2) | (2) | 8 | 11 |
| Colombia......... | (3) | (3) | (3) | (3) | 17 | 33 | 20 | 7 |
| India............ | 0 | 0 | 1 | 4 | (2) | 29 | 9 | 4 |
| Other[4]........... | 1 | 1 | 1 | 4 | 28 | 24 | 13 | 23 |
| Total.......... | 178 | 220 | 249 | 355 | 211 | 316 | 359 | 456 |

[1] 1920-44, bales of 478 pounds; 1945 to date, bales of 480 pounds.

[2] Less than 500 bales.

[3] If any, included in other countries.

[4] Includes exports in at least one or more years to: Australia, Austria, Bolivia, Canada, Costa Rica, Cuba, Czechoslovakia, Ecuador, Finland, Guatemala, Ireland, Israel, Mexico, Norway, Poland, Portugal, Shanghai, Spain, Sweden, Union of South Africa, Uruguay, and Venezuela.

Sources: 1920-29 from Statistics on Cotton and Related Data, 1920-1956, USDA Statistical Bulletin No. 99, February 1957. 1930 to date from Cámara Algondonera del Perú Memoria Anual.

Since Tanguis is by far the most important variety produced in Peru, it is not surprising that 25 of the 27 countries to which Peru exported cotton in 1958 took Tanguis. Twenty of these 25, plus 2 additional countries, took Pima. All of the 12 countries taking Peruvian Karnak cotton also took Pima and 11 of them took Tanguis and Pima in addition to Karnak. The bulk of the Acala and Aspero cotton exported went to the group of countries that are the largest customers for Peruvian cotton.

## THE PERUVIAN TEXTILE INDUSTRY

Cotton textiles have been handmade in Peru for many centuries, but factory production of cotton textiles appears to have started during the early years of World War I. Among the factors that undoubtedly entered into the construction of the original factories were the disruption of trade and high prices of textiles during the war. Mill consumption of cotton in 1916 is reported to have been about 2,000 bales. From 1917 through 1932, mill consumption of cotton fluctuated between 13,000 and 19,000 bales, with a tendency toward the upward end of this range except in the early 1920's.

An upward trend began in 1933 when consumption reached 24,000 bales. It first reached 30,000 bales in 1935, 50,000 bales in 1942, 65,000 bales in 1948, and 80,000 bales in 1954. From that year through 1960 consumption has held between 70,000 and 80,000 bales.

TABLE 5.--Production, acreage, exports and consumption, 1916 to date

| Year | Production | Acreage | Exports | Consumption |
|---|---|---|---|---|
| | *1,000 bales*[1] | *1,000 acres* | *1,000 bales*[1] | *1,000 bales*[1] |
| 1916.................... | 113 | 137 | 111 | 2 |
| 1917.................... | 125 | 158 | 79 | 18 |
| 1918.................... | 139 | 192 | 99 | 17 |
| 1919.................... | 149 | 220 | 183 | 15 |
| 1920.................... | 177 | 258 | 159 | 14 |
| 1921.................... | 186 | 268 | 167 | 13 |
| 1922.................... | 199 | 275 | 182 | 13 |
| 1923.................... | 212 | 281 | 199 | 14 |
| 1924.................... | 215 | 287 | 188 | 16 |
| 1925.................... | 210 | 293 | 191 | 14 |
| 1926.................... | 246 | 316 | 228 | 16 |
| 1927.................... | 246 | 316 | 259 | 19 |
| 1928.................... | 225 | 283 | 213 | 18 |
| 1929.................... | 303 | 313 | 208 | 17 |
| 1930.................... | 271 | 330 | 252 | 17 |
| 1931.................... | 234 | 314 | 215 | 18 |
| 1932.................... | 242 | 304 | 213 | 18 |
| 1933.................... | 278 | 322 | 252 | 24 |
| 1934.................... | 342 | 367 | 308 | 25 |
| 1935.................... | 393 | 401 | 357 | 30 |
| 1936.................... | 386 | 409 | 371 | 30 |
| 1937.................... | 376 | 388 | 372 | 31 |
| 1938.................... | 396 | 471 | 321 | 29 |
| 1939.................... | 378 | 439 | 363 | 34 |
| 1940.................... | 383 | 432 | 230 | 36 |
| 1941.................... | 329 | 420 | 382 | 45 |
| 1942.................... | 322 | 386 | 155 | 52 |
| 1943.................... | 262 | 309 | 165 | 53 |
| 1944.................... | 310 | 319 | 125 | 53 |
| 1945.................... | 325 | 338 | 280 | 53 |
| 1946.................... | 327 | 341 | 550 | 51 |
| 1947.................... | 299 | 297 | 259 | 55 |
| 1948.................... | 282 | 308 | 234 | 63 |
| 1949.................... | 309 | 363 | 257 | 67 |
| 1950.................... | 337 | 332 | 335 | 57 |
| 1951.................... | 382 | 396 | 284 | 59 |
| 1952.................... | 443 | 469 | 382 | 56 |
| 1953.................... | 441 | 507 | 403 | 63 |
| 1954.................... | 514 | 517 | 391 | 73 |
| 1955.................... | 482 | 537 | 401 | 68 |
| 1956.................... | 529 | 561 | 507 | 68 |
| 1957.................... | 484 | 588 | 352 | 67 |
| 1958.................... | 526 | 587 | 503 | 66 |
| 1959.................... | 532 | 582 | 518 | 77 |
| 1960[2].................. | 599 | 618 | 474 | 82 |
| 1961[2].................. | 592 | 618 | -- | -- |

[1] 1916 to 1945, bales of 478 pounds. 1946 to date, bales of 480 pounds.

[2] Estimate.

Source: Algodón Bulletin de la Camara Algodonera de la Perú; Anuario Estadistico del Perú and Memoria Anual.

Over the past decade, Peru has imported comparatively small quantities of cotton yarn, cloth, and other cotton manufactures. Peru has even smaller exports of cotton textiles. Imports account for about 10 percent of the supply of cotton textiles available for use within the country. The quantity of available cotton textiles was about 4.1 pounds per capita in 1957, the latest year for which data are available. This compares with 3.8 pounds in 1948 and 2.8 pounds in 1938.

In interpreting these data on per capita availability, it must be recognized that there are wide variations in consumption levels. Concentrated mainly in the high mountains and eastern jungles are some 2 to 4 million people whose very low incomes and very way of life prevent them from being customers for textiles and other industrial items.

Peru has a wool manufacturing industry that utilizes about one-fourth as much raw material as is consumed in the cotton industry. There is also a factory producing rayon filament yarn, but Peru imports all rayon staple fiber and all noncellulosic man-made fibers consumed.

According to the "United Nations Study of Productivity of the Cotton Textile Industry in Latin America," published in 1951, Peru had 24 cotton mills containing 176,332 spindles and 6,304 looms. Twenty-five percent of the spindles and 35 percent of the looms had been purchased as new machinery since January 1, 1925. The United Nations Study went on to point out that the new equipment had, for the most part, replaced old machinery in the existing mills. In this respect, Peru differed from the other countries studied, since the Peruvian mills had a combination of old and new machinery, but in the other countries, old mills did little or no modernizing and all new machinery went into entirely new mills.

A comprehensive study of the Textile Industry in Peru published in 1957 reported that there were 26 cotton textile mills and they employed 8,241 workers. Of these, 20 mills were in Lima and Callao. Arequipa and Ica each had two, and Cusco and Piura each had one. These 26 mills had a total of 195,360 spindles. Of these, 600 were considered to be out of service and 194,760 in use. Of these, 36,000 were less than 5 years old, 104,380 were from 5 to 30 years of age and 54,380 were over 30 years old.

Peruvian cotton mills had 6,081 looms, of which 3,700 were automatic and 2,381 were nonautomatic. Of the automatic looms, 597 were less than 5 years old and 3,103 were older. Of the 2,381 nonautomatic looms, 928 were between 5 years and 30 years of age, and the remaining 1,453 were older than 30 years.

Practically all (about 98 percent) of the cotton consumed is Tanguis, mostly of grades 3-6 inclusive. Pima comprises most of the remaining 2 percent.

Although in 1958 there appeared to be little confidence in the practicality of trying to increase per capita consumption of cotton textiles, there may still be some basis for optimism as the economy of the country expands. As has been noted, the per capita quantity of cotton textiles available has shown a rather substantial rise and there appears to be no obvious reason why this upward trend will not continue. In fact, the development programs now underway and in prospect would suggest that a gradually increasing proportion of the population may become incorporated into the economic life of the nation. Furthermore, there would appear to be reason for believing that this expanding group will also experience a rise in average level of living that will be reflected both in better nutrition on the average and in higher consumption of clothing. Cotton certainly would share in such gains.

There are still other reasons for optimism. The Textile Institute, a part of the National Engineering University, is working to provide a growing supply of well-trained textile engineers technically competent to handle the engineering and operating problems of the textile industry.

If the belief is well-founded that Peru will soon be entering a new period of economic growth and development, the economic climate should be favorable and the means available to enable the cotton textile industry to both modernize and expand. Of course, modernization is needed along more lines than just machinery. Important strides also need to be made in labor efficiency if the potential improvement in production efficiency is to be realized.

To date, the Peruvian raw cotton and textile industries have never developed a unified program for promoting increased domestic consumption of cotton textiles. Regardless of whether or not market promotion, based upon careful market research, would have paid good dividends in the past, the time would appear to be at hand when such activities might clearly be expected to achieve desirable results. Of course, such efforts would need to be developed with a proper regard for the peculiar characteristics of Peru. However, this in itself should not prove to be a serious obstacle.

## PROSPECTS FOR COTTON DEVELOPMENT

Prospects. All signs point to a continuation of the upward trend in Peruvian cotton production, but the rate of gain may be more gradual than during the past 10 or 15 years. Some additional land in the irrigated coastal cotton valleys will be brought under cultivation as major public irrigation projects are brought to completion or as the drilling of wells or improvements on present farms permit. It is also to be expected that over the next decade, average yields will increase as improvements made in the efficiency of water utilization more than offset continued soil deterioration through leaching, erosion, waterlogging, and salinity.

Yields also are expected to show gains as a result of the variety improvement work that is being carried on with Tanguis cotton. The increased use of high-yielding strains of cotton, the basic seed stock for which is imported, may also cause average yields for these varieties to improve in time.

One of the largest areas of uncertainty covering the future of cotton in Peru is in the area of intercrop competition. The experience of recent years has demonstrated the effect price relationships between cotton and rice can exert upon the acreage and production of these two crops.

Looking ahead, one can assume that a concerted effort will be made in Peru to raise the average level of living of the masses of the people. Such a development would undoubtedly increase the market for domestic food products. Some forces at work would tend to encourage much of the increases in food production to occur in the areas east of the coastal valleys. One point of view is that the coastal valleys should concentrate mainly on plantation export crops to earn foreign exchange--even to the extent of reducing food production and possibly having to import more food from abroad. There are others who would doubt that increasing the emphasis upon production of export crops is an effective means of trying to raise the level of living of the working classes in the coastal sections of Peru.

It is reasonable to assume that there may be little, if any, shift in the relative emphasis given cotton and food production in the coastal cotton valleys, and increased production of both cotton and food will reflect improvements in general productive capacity of the coastal area.

Impediments. Many factors exert a restraining influence upon cotton production in Peru. The upward trend in production bears testimony to the success of the Peruvians in overcoming such obstacles.

Even a casual observer of Peruvian coastal-valley farming cannot help being impressed with the overriding importance of irrigation water. Without irrigation, the land is a desert; with irrigation, it is capable of producing marvelous crops of such products as cotton, rice, and sugar cane. Anything that adds to the supply of water available through the growing season either permits the extension of water to additional acreage or increases the supply of water for existing irrigated acreage. In either case production would increase.

Dams and diversion channels have both been used to increase the supply of available irrigation water in coastal streams, the most recent major achievement being the diversion of water from the Choclococha and adjacent lagoons in the high Andes into the Ica valley. The diversion of these lagoons, located at an elevation of about 15,000 feet, will augment the water supply by an estimated 1.45 billion cubic meters annually, and will insure adequate year-round irrigation for 24,000 hectares of land that had been dependent on seasonal rainfall in the mountains. It will also make possible the reclamation of additional land.

Another example is the building of the San Lorenzo dam on the Quiroz river and the resulting diversion of water from a tributary of the Chira river, in which water supplies are abundant, into the Piura river drainage basin, where supplies are much more limited. In time, much of this diverted water will be used on land not previously farmed. For the first few years, it merely added to the general availability of water in the Piura river and was available for the use of farms that obtain their water from that source. Farms in the Quiroz project will come under irrigation during the next few years.

Another impediment limiting production is the inefficiency with which much of the available water is utilized. Progress is being made in this area, but it still remains a significant difficulty.

Insects pose a somewhat different problem in parts of Peru from that encountered in most other producing countries. Some of the valleys are quite small and widely separated from other producing valleys by wide expanses of desert. As a consequence, use of insecticides to control injurious insects has, at times, been known to virtually exterminate the entire population of some beneficial insects that serve as natural predators, thereby intensifying rather than easing the control problem. Concern over this factor has led the farmers in most cotton valleys to cooperate in formulating regulations barring the use of certain insecticides and regulating the use of others. The Cañete farmers support considerable research on biological control of injurious insects at the Cañete Cotton Research Station, and to a considerable extent, the benefits of this work accrue to cotton producers in all parts of Peru.

Fertility is still another problem in Peruvian cotton production. Some of the difficulty traces back to the manner in which irrigation water is applied and the amount of water used. Ill effects vary from place to place, but they include salinity, leaching, and erosion. Some of these adverse effects can be satisfactorily dealt with by the farmer himself. Others, however, involve broader considerations and must be dealt with on a valley-wide or national basis. On both kinds of problems, it can be noted that progress is taking place in some areas but in others, damage continues to occur.